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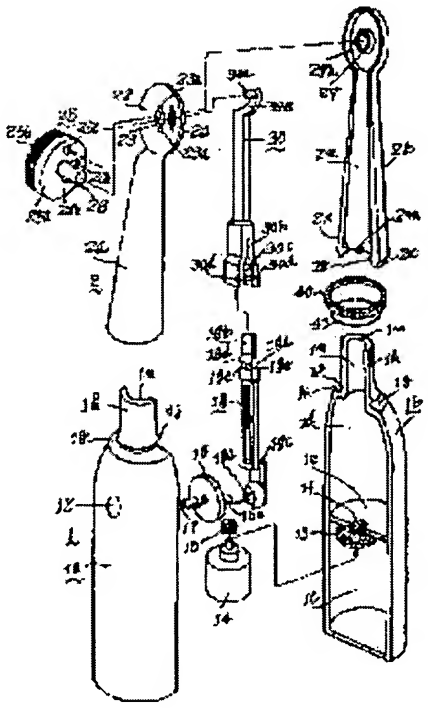
(54) MOTOR TOOTHBRUSH

(57)Abstract:

PURPOSE: To provide a low price motor toothbrush with little noise and composed of a reduced number of parts.

CONSTITUTION: On the main body 1 side, the shaft rotation of a motor 14 is converted to linear reciprocal oscillation of a first output shaft by an eccentric cam 16 coaxial to a crown gear 16. On the exchanging brush 2 side, a hook part 30a at the tip of a second output shaft 30 is engaged with an engaging hole 25c of a toothbrush head 25 to convert the linear reciprocal oscillation to rotational oscillation. The main body 1 and the exchanging brush part 2 can be connected by inserting and pushing an inner diameter part 2n into a neck part 1h and simultaneously a connecting part 19b is fitted and connected into a fitting part 30b of a second output shaft 30 to connect both output shafts. Since the dislocation quantity of the output shaft by rotation of the eccentric cam shaft 16a is set at about 90° against the rotation angle of the tooth brush head 25, the toothbrush head 25 oscillates switching the rotation direction within a constant angle range with little noise.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The electromotive gear-tooth brush characterized by connecting the location which made the motor the driving source, consisted of a movement translator which changes rotation of the shaft of this motor into linear rocking movement, and a gear-tooth brush head supported to revolve good [rotation] at the tip of the shank of a gear-tooth brush, and carried out eccentricity from the output shaft of said translator, and the rotation shaft of said gear-tooth brush head.
[Claim 2] Said gear-tooth brush shank is divided into the body of a configuration which held said driving source and fitted grasping, and the ** brush section which prepared said gear-tooth brush head, and it has a mutual attachment-and-detachment means. Said output shaft It divides into said said body and ** brush section side, and has a mutual attachment-and-detachment means. Said two attachment-and-detachment means The electromotive gear-tooth brush according to claim 1 characterized by both consisting of a fitting means of the relation of the sex of the longitudinal direction of said gear-tooth brush shank, and a stop means by the **** structure of acting in the direction of a field which intersects perpendicularly with said direction.
[Claim 3] The fitting means of the relation of the sex of said body and said ** brush section is an electromotive gear-tooth brush according to claim 2 with which the neck section installed in said body upper limit and the bore section of said ** brush section lower limit fit in insertion, and set up the die length of a fitting part for a long time.
[Claim 4] The output-shaft tip of said translator is an electromotive gear-tooth brush given in claims 1 and 2 characterized by constituting so that it may connect with the location which was made to carry out eccentricity from an output shaft center in near an output-shaft tip, and carried out eccentricity from the rotation shaft of said gear-tooth brush head.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] The motor driven with a dc-battery is held into the case, and this invention relates to the electromotive gear-tooth brush with which this motor drives a gear-tooth brush head through a power transmission device.
[0002]
[Description of the Prior Art] The above electromotive gear-tooth brushes are already well-known, and the motor and the dc-battery which drives it are held in the handle part which a user holds, and the general thing of that structure makes exchangeable a part for the point containing the brush section at a tip, in order to enable common use of this handle part to two or more users. Although the structure which makes only the gear-tooth brush head at a tip exchangeable is also considered for two or more of these users common use, since the gear-tooth brush head is circular and very small, when it should drop out of an installation part, since it is accompanied by risk of a user understanding accidentally, it is not adopted. Moreover, it is also known that the direction which switches a hand of cut to hard flow by turns finely rather than rotation of only a direction has effectiveness in dental defecation on the other hand as for actuation of the brush at a tip.
[0003]
[Problem(s) to be Solved by the Invention] In order to acquire effectiveness to dental defecation, while rotation of the brush part at a tip transmitted rotation of a motor simply, it is not rotation of only a direction as mentioned above. In order to switch a hand of cut to a clockwise rotation and a counterclockwise rotation finely So that the former, for example, JP,3-82464,A, may see, one bevel gear may be driven to an one direction and the bevel gear of another side may be driven to an opposite direction Carry out opposite arrangement of the two bevel gear, and the crown gear which lacked the gear tooth over the radii limited since it drove by turns to these two bevel gear to which driving force is transmitted is prepared. Generally the structure which combined two or more gears which switch the hand of cut of a brush part by rotation of the shaft which stands in a row in this crown gear is used.
[0004] Since this hand of cut is finely switched to hard flow by turns, because the sound with which a gear is constructed with and a gear gears in the case of ********** structure, and the sound which switches a gear are not avoided inevitably but an application uses this noise by people's inner mouth, it was what is transmitted to an acoustic sense by bone conduction and causes displeasure by it. Moreover, since there were many classes of gear to constitute and use and structure was also complicated, it was what is not avoided to become cost quantity. This invention aims at solving these fault points.
[0005]
[Means for Solving the Problem] According to this invention, the above-mentioned technical problem makes a motor a driving source, and it consists of a movement translator which changes rotation of the shaft of this motor into linear rocking movement, and a gear-tooth brush head supported to revolve good [rotation] at the tip of the shank of a gear-tooth brush, and is solved by connecting the location which carried out eccentricity from the output shaft of said translator, and the rotation shaft of said gear-tooth

brush head.
[0006] The above-mentioned technical problem is set for the preceding clause. Moreover, said gear-tooth brush shank It divides into the body of a configuration which held said driving source and fitted grasping, and the ** brush section which prepared said gear-tooth brush head, and has a mutual attachment-and-detachment means. Said output shaft It divides into said said body and ** brush section side, and has a mutual attachment-and-detachment means. Said two attachment-and-detachment means It is solvable with constituting so that it may both consist of a fitting means of the relation of the sex of the longitudinal direction of said gear-tooth brush shank, and a stop means by the **** structure of acting in the direction of a field which intersects perpendicularly with said direction.
[0007] Furthermore, the neck section to which the above-mentioned technical problem installed the fitting means of the relation of the sex of said body and said ** brush section in said body upper limit in the beforehand term, and the bore section of said ** brush section lower limit fit in by insertion, and it is solved by having set up the die length of a fitting part for a long time and.
[0008] Moreover, the above-mentioned technical problem can solve the output-shaft tip of said translator in beforehand **** and a beforehand term with having constituted so that it might connect with the location which was made to carry out eccentricity from an output shaft center in near an output-shaft tip, and carried out eccentricity from the rotation shaft of said gear-tooth brush head.
[0009]
[Function] The output shaft outputted from the movement translator which changes rotation of the shaft of a motor into linear rocking movement drives the location which carried out eccentricity from the rotation shaft of a gear-tooth brush head, and makes hard flow rotate a gear-tooth brush head by turns. Since this rotation actuation does not make a gear etc. intervene, there is little noise and it is smooth.
[0010] The mutual attachment-and-detachment means of the output shaft divided into the attachment-and-detachment means between division partial of a body and the ** brush section, and a body side and a ** brush section side and both the attachment-and-detachment means made the same configuration can become possible [detaching and attaching both to coincidence by one actuation], and can save the time and effort of actuation.
[0011] Since sufficient reinforcement is guaranteed to a body and the external force applied between the ** brush sections, mutual separates simply or the sex-related fitting section of the body and the ** brush section which set up the duplication part longer enough is not destroyed.
[0012] Since the output-shaft tip made to connect with the location which was made to carry out eccentricity from an output shaft center in near an output-shaft tip, and carried out eccentricity from the rotation shaft of a gear-tooth brush head makes it possible to set up the neck section of the ** brush section thinness, the dentifrice actuation which is easy to insert the configuration of the tip approach of the ** brush section in inner mouth shall tend to carry out it.
[0013]
[Example] Each drawing is the thing of one example of this invention. Drawing 2 is the front view showing the whole concept, it consists of a gear-tooth brush shank of 10, and a gear-tooth brush head of 25 of a tip, and this shank 10 is divided into a body and the ** brush section. that is, 1 was the body of the shape of a handle which a user holds, carried out insertion connection of the below-mentioned ** brush section 2 at the tip, and built the motor of a driving source, and the dc-battery of a power source in the interior, and equipped the peripheral face with the electric power switch 12, and made tip approach the minor diameter a little -- it is cylindrical in general and is an owner bottom. It is the ** brush section of a taper by which insertion connection is carried out removable on said body 1, 2 attaches the aforementioned circular gear-tooth brush head 25 at a tip, and since it corresponds to two or more users, two or more preparation of it is usually carried out. 40 is a ring for the below-mentioned waterproofing etc.
[0014] Drawing 1 is the explanation perspective view decomposed so that it might be easy to understand the whole concept shown in drawing 2 . Moreover, drawing 3 and 4 are the front views and side elevations having shown a part of assembly condition in the cross section. Each part is explained referring to these drawings.

[0015] A body 1 is fabricated by resin, 2 ****s is carried out on the convenience which holds components, such as a motor, in the interior, and before and behind a lengthwise direction, it constitutes from the 1st front partial 1a and the 2nd partial 1b on the back, and both are combined by **** which is not illustrated. Since said 1st partial 1a and 2nd partial 1b are almost symmetrical configurations, it explains focusing on 2nd partial 1b on account of the illustration in drawing 1 .
[0016] As described above, if 1st partial 1a and 2nd partial 1b are assembled, the owner bottom of the body 1 will be in general cylindrical, and it will hold a dc-battery (not shown) and a motor 14 in internal lower part 1c. The separation of the aforementioned internal lower part 1c and the 1d of the upper parts was carried out by diaphragm 1e, and the waterproofness of internal lower part 1c in which an electrical part is mainly held is secured. A motor 14 makes the revolving shaft project from 1f of notches of the hemicycle of the aforementioned diaphragm 1e to the upper part through the stoma of the waterproofing packing 13, and attaches a gear 15 at a tip further. Diaphragm 1e is formed also in the antimere of 1st partial 1a of a body 1 as described above including 1f of notches of a hemicycle.
[0017] 16 is a crown gear which gears with said gear 15. This crown gear 16 is supported to revolve by the shaft 17 pivotable, and this shaft 17 is held by shaft receptacle 17a of the internal upper part of body 1a. The crown gear 16 is equipped with eccentric shaft 16a which made the field which intersects perpendicularly with the shaft carry out eccentricity from a shaft 17, it was made to project, and was formed in it at one.
[0018] 19 is the 1st output shaft. An end is made a little thick, it has the shape of a lever which had axial hole 19a which fits into said eccentric shaft 16a pivotable in this part, and is the product made of resin in which tongue tabular bond part 19b for combining the other end with the 2nd below-mentioned output shaft was formed, and flection 19c is prepared in the middle and the aforementioned thick part is balanced. Moreover, crevice 19e is symmetrically formed in both sides at the lower part approach of said bond part 19b following it with 19d of heights for also combining this with the 2nd below-mentioned output shaft.
[0019] on the other hand, the dished part which is formed by resin shaping, retreats a little at a tip, and attaches a circular brush was prepared, and the ** brush section 2 had the taper which serves as a major diameter to a lower part considering the base of a dished part as a neck of a minor diameter -- it is cylindrical in general and is divided into two on account of an assembly approximately in a lengthwise direction. In drawing 1 , 2a is the front section, 2b is the tooth-back section, and both are combined with the means of an illustration abbreviation.
[0020] The slot 24 of a lengthwise direction is formed in the dished section 22 at the tip of front section 2a at the axial hole 23 held good [rotation of the shaft of a gear-tooth brush head] at the core, and the width side. Slit 23a of the shape of two keyhole is formed in the bottom of the improvement in the method of a radius at intervals of 180 degrees at the bore section of the axial hole 23 of a gear-tooth brush head. On the other hand, the dished section 27 is formed at a tip by tooth-back section 2b of the ** brush section 2 like front section 2a. 27a is the bearing of the rotation shaft of the below-mentioned gear-tooth brush head established in the center of dished section 27 inside.
[0021] Although the coupling means of front section 2a and tooth-back section 2b omits illustration, when both are assembled as mentioned above and it joins together, cylinder-like space is set up and the interior serves as the dimension configuration of having been suitable for the 2nd below-mentioned output shaft being held.
[0022] hair 25b which 25 is said gear-tooth brush head, and consists of a material which fitted one field of disc-like base 25a for toothbrushing -- implanting -- on the other hand -- being alike -- the rotation shaft 26 is installed. Piece of the stop of two sheets 26a for wing-like prevention [omission] is formed in the bottom of the improvement in the method of a radius at intervals of 180 degrees at this rotation shaft 26 end. Furthermore, hook engagement hole 25c is formed in the predetermined location of the field in which said rotation shaft 26 was installed.
[0023] 30 is the 2nd output shaft. It is the product made of resin of the shape of a lever of straight side, the whole makes an end curve from the core of a longitudinal direction near [the] a tip, sets it to offset section 30e, it turns the tip ahead further, makes a right angle project, and is taken as hook section 30a

which carried out installation formation at one. On the other hand, the attachment-and-detachment means for making it combine with the 1st above-mentioned output shaft is formed in the other end.
[0024] The aforementioned attachment-and-detachment means forms in the maximum inner intussusceptum 30b which has the dimension of spacing suitable for tongue tabular bond part 19b at the 1st output-shaft 19 aforementioned tip being inserted, and pinching this. Then, it guides so that it may be [tongue tabular bond part 19b] easy acceptance, and as for the field of formation and said two persons, guide section 30c suitable for after association holding 19d of heights of the 1st output shaft 19 which has the dimension of a little larger spacing than said intussusceptum 30b is connected in respect of the taper. Furthermore, 30d of pawls combined with crevice 19e of the 1st output shaft 19 is opposed and formed in the both sides at the tip inside of this guide section 30c.
[0025] Next, the structure for attachment and detachment with a body 1 and the ** brush section 2 is explained. The 1st partial 1a and the 2nd partial 1b are projected to 1g page of the up flat part at a body 1, 1h of a little semicircle tubed neck sections of a minor diameter is installed comparatively longer, they turn into 1h of cylinder-like neck sections by junction to 1st partial 1a and 2nd partial 1b so that drawing 1 may see, and fitting of the ** brush section 2 is made to carry out here. Although considered as the bore section of a circular cross section in the example, since 1n of bore sections of 1h of neck sections is the dimension configuration which holds the 1st output shaft 19 and shaft orientations may be made to rock and the 1st output shaft 19 is a cross-section rectangle, according to it, it does not interfere in a rectangle, either.
[0026] 1k is a ring-C fitting slot, and is formed in the small upper part over the perimeter from the lower limit of 1h of cylinder-like neck sections. 1j is the stop section further formed in the upper part, gives a taper so that it may be easy to introduce the ** brush section 2 further inserted from the upper part, and is formed in a little large diameter while it stops the below-mentioned ring C inserted in ring-C fitting slot 1k.
[0027] 1m, it is the guide rail formed only in the 1st [of a body 1] partial 1b side, and in order to regulate the sense of insertion of the ** brush section 2 inserted from the upper part, it is prepared covering the lengthwise direction overall length of the center of a tooth back of 1st partial 1b of a body 1, and 1h of neck sections.
[0028] Front section 2a and tooth-back section 2b have formed in the lower limit periphery narrow diameter portion 2c to which fitting of the ring 40 is carried out at the ** brush section 2 side. And when front section 2a and tooth-back section 2b are combined, the inner circumference accepts 1h of neck sections of the shape of a cylinder of a body 1, and is formed as 2n of the bore sections which gave the dimension suitable for joining together. Several engagement projection 2k used as the engagement means at the time of combining a body 1 and the ** brush section 2 is formed in the lower limit edge of 2n of bore sections to the perimeter. 2m is a guidance projection which regulates the sense of insertion in the case of making the ** brush section 2 insert in a body 1.
[0029] Next, the assembly of the above component is described. In 2nd [of a body 1] partial 1b, the waterproofing packing 13 is inserted in the revolving shaft for a motor 14, and a gear 15 is fixed, and it fixes so that diaphragm 1e may exist between the waterproofing packing 13 and a gear 15. Furthermore, the dc-battery holder of an illustration abbreviation, wiring, etc. are held in the part which secured the waterproofness of internal lower part 1c of a body 1. In 1d of internal upper parts of 1st partial 1a of a body 1 The end of a shaft 17 is inserted to shaft receptacle 17a. The crown gear 16 at this shaft 17 Fitting, Furthermore, carry out fitting of the axial hole 19a of the lower limit of the 1st output shaft 19 to eccentric shaft 16a of the crown gear 16, and where the upper part is made to project from 1n of bore sections, tongue tabular bond part 19b of the upper limit of the 1st output shaft 19 1st partial 1a and 2nd partial 1b are not illustrated -- ****, or carry out joint immobilization by adhesion etc., the steel ring C 41 is made to insert in ring-C slot 1k, and the assembly of a body 1 is completed.
[0030] Next, the assembly of three persons of front section 2a of the ** brush section 2, tooth-back section 2b, and the gear-tooth brush head 25 Fixed piece 26a of the rotation shaft 26 of the gear-tooth brush head 25, and the shape of its wing first, from the front-face side of the dished section 22 at the tip of front section 2a After inserting in slit 23a of the axial hole 23 of a gear-tooth brush head, and the

shape of its keyhole, engagement hole 25c prepared in the field twists this gear-tooth brush head 25 to the location which overlaps the slit 24 of the dished section 22.
[0031] In this condition, both are combined with the engagement means which omitted illustration in the point of front section 2a and tooth-back section 2b, making the above-mentioned slit 23a penetrate, inserting hook section 30a at the tip of the 2nd output shaft 30 which made those shaft orientations said engagement hole 25c meet the rear-face side of front section 2a, and maintaining this condition (for example, irregularity).
[0032] Fitting maintenance of the point of the rotation shaft 26 of the gear-tooth brush head 25 is carried out good [rotation] by bearing 27a prepared in dished section 27 inside of tooth-back section 2b at the time of this association. The assembly of the ** brush section 2 is completed by inserting in the ring 40 formed in the lower limit narrow diameter portion 2c by the rubber material which served both as maintenance and waterproofing of an integrated state.
[0033] The body 1 assembled as mentioned above, respectively and the ** brush section 2 are combined in use. With sense into which 2m of guidance projections of the ** brush section 2 goes, 1h of fitting sections of the shape of a cylinder of the edge of a body 1 is inserted in 2n of bore sections of the lower limit of the ** brush section 2, and it pushes into 1m of guide rails of a body 1 still more strongly. Consequently, although engagement projection 2k of the lower limit of 2n of bore sections of the ** brush section 2 contacts the ring C 41 with which the body 1 was equipped, with the elasticity which the ** brush section 2 has, it expands minutely, and the location which overcame this will be entered, it will be stabilized, and both will be in an integrated state. The partial enlarged drawing of drawing 5 has shown this condition.
[0034] Tongue tabular bond part 19b of the upper limit of the 1st output shaft 19 which was in the condition of having made coincidence projecting from 1n of bore sections to the upper part by the aforementioned insertion and pushing actuation Although 30d of pawls contacts 19d of heights by being accepted in guide section 30c of the lower limit of the 2nd output shaft 30 in 2n of bore sections of the ** brush section 2, and being pushed in further Spacing spreads, insertion becomes possible and insertion pinching of the tongue tabular bond part 19b is carried out by the elasticity which the 2nd output shaft 30 has at intussusceptum 30b. With it, 30d of pawls of the 2nd output shaft 30 enters into crevice 19e of the 1st output shaft 19, and they hold both to an integrated state.
[0035] Thus, if the electric power switch 12 of the assembled electromotive gear-tooth brush of this invention is turned on, a motor 14 will drive with a dc-battery and rotation and eccentric shaft 16a will make the longitudinal direction rock [gear / 16 / crown] the 1st output shaft 19 and 2nd output shaft 30 through a gear 15. Although rocking of the 2nd output shaft 30 is changed into rotation-rocking of the gear-tooth brush head 25 since hook section 30a at the tip of the 2nd output shaft 30 penetrates a slot 24 and is being engaged in engagement hole 25c of the gear-tooth brush head 25 Since the amount of displacement of the output shaft by rotation of eccentric shaft 16a is set as 180 or less degrees to the angle of rotation of the gear-tooth brush head 25, it is rocked not rotating in a direction on the other hand, and the gear-tooth brush head 25 switching a hand of cut by fixed include-angle within the limits. Moreover, since the dimension of a slot 24 is also balanced and set as the amount of rocking of hook section 30a, it is convenient in rocking actuation.
[0036] Removal with a body 1 and the ** brush section 2 can remove easily by drawing out mutually conversely at the time of installation. And mutual association is canceled by coincidence and two output shafts are also estranged to it. Therefore, it becomes possible to share a body 1 by two or more numbers.

[0037] When a shaft orientations' of 2nd output shaft 30 by the side of the ** brush section 2 existence location is not necessarily fixed and other ** brush sections are used after that at the time of the joint actuation between the aforementioned body 1 and the ** brush section 2, the mutual physical relationship with the 1st output shaft 19 by the side of a body 1 goes wrong. If the condition is the direction which approaches mutually, it will be convenient to association between output shafts, but it will become joint impossible if it is in the receding condition. However, a motor 14 is operated by setting an electric power switch 12 to ON, and by making the 1st output shaft 19 rock, mutual physical

relationship is amended and can combine both. Since the dimension of a slot 24 is set up so that the excessive migration to the upper part of hook section 30a may be regulated, the aforementioned association is ensured.

[0038] In the above example, moreover, attachment and detachment with a body 1 and the ** brush section 2 Although association and attachment and detachment of two output shafts were constituted from inserting a ring in 1h of neck sections by the side of a body 1, and inserting in the crevice where it considered as the convex and the projection of 2n of bore sections of the ** brush section 2 overcame it so that the 1st output-shaft 19 side might be inserted in the 2nd output-shaft 30 side Making it reverse does not interfere, either and both the former concavo-convex relation and the latter sex relation can be carried out.

[0039] 1h of neck sections of the upper part of a body 1 needs to give a longer dimension to some extent and to fully take a fitting duplication part with 2n inside of bore sections of the ** brush section 2. As [destroy / separate easily as ******** by which unusual external force is added a body 1 and between ** brush section 2, or / by doing in this way,]

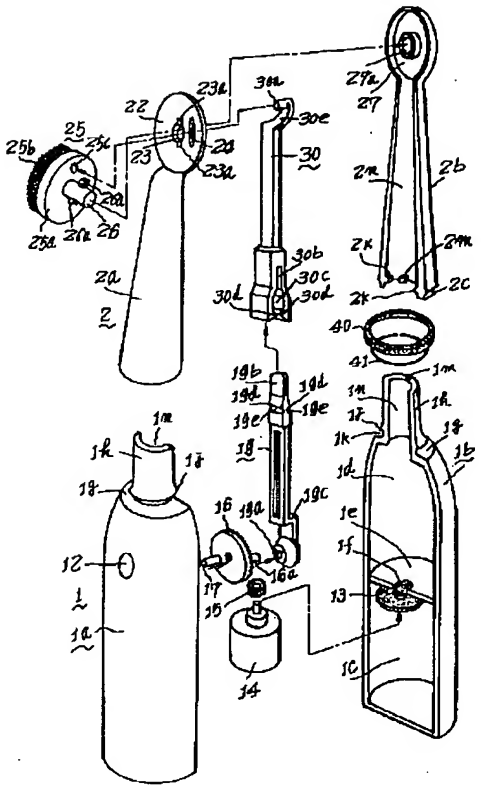
[0040] Although the body 1 was constituted from the above example in the lengthwise direction further again so that it might divide into two, the lower half of a body 1 can also be considered as a bell and spigot to an upper half as tubed on waterproof relation or the relation of dc-battery exchange. Moreover, although the attachment-and-detachment means of the divided output shaft was considered as association of a tongue tabular part, even if it forms this by relation, such as a configuration of the round bar etc., and a cylinder-like configuration of accepting it, it does not interfere, and the same operation effectiveness is acquired.

[0041]

[Effect of the Invention] It seems that there are few gear sounds and displeasure by the noise at the time of using it by inner mouth is not caused since use of the gear in an electromotive gear-tooth brush is stopped only in a body and rotation-rocking of a gear-tooth brush head was obtained via the linear reciprocating motion according to this invention as mentioned above. Moreover, since attachment and detachment with a body and the ** brush section and the attachment and detachment of an output shaft which transmit the bisected drive can carry out by one actuation, it does not take the time and effort of attachment and detachment. Furthermore, since the whole structure is brief, there are also few components mark and there is effectiveness also in reduction of cost.

[Translation done.]

Drawing selection Representative drawing



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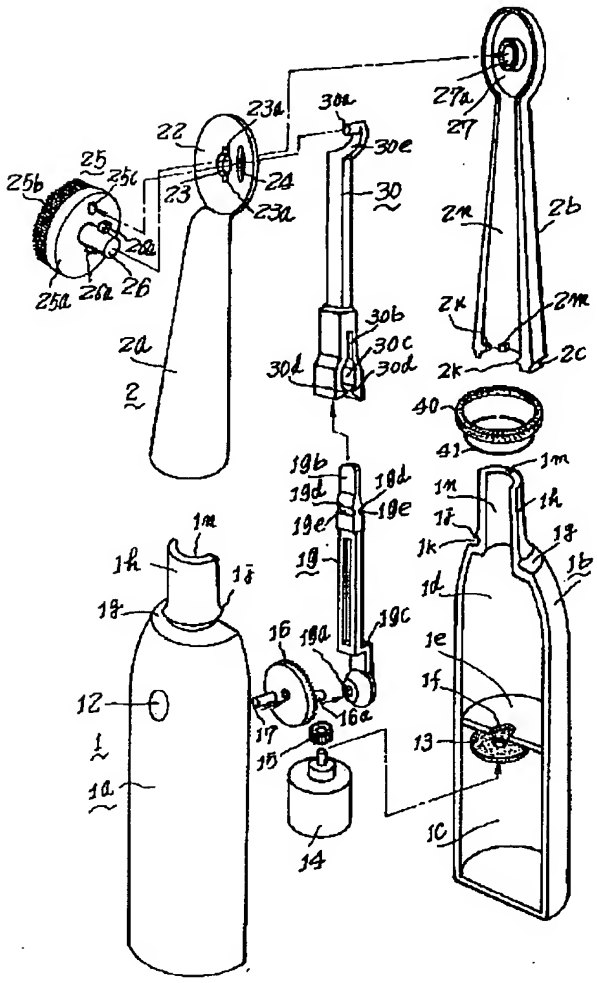

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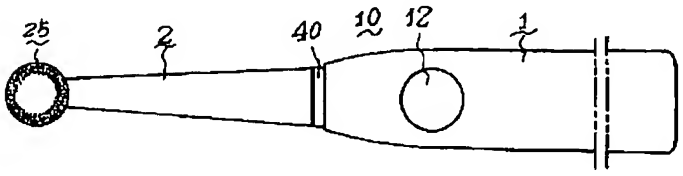

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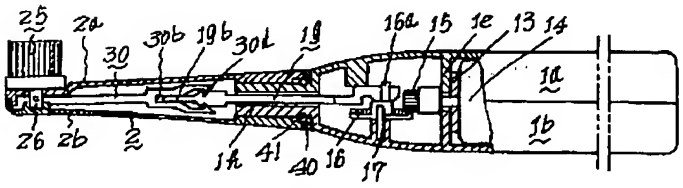

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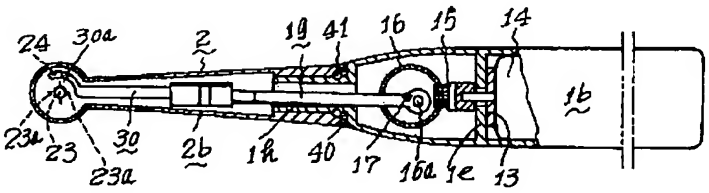

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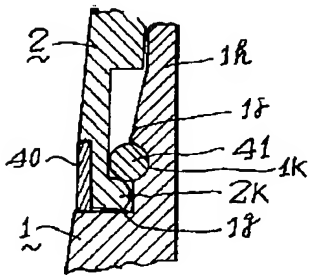

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